

Bangalore 2000-0034

Remarks

Reconsideration of rejected claims 1-7 is respectfully requested.

In the Office action dated June 16, 2004 (application Paper No. 4), the Examiner rejected all pending claims under 35 USC § 103(a). The Examiner's various rejections will be discussed below in the order appearing in the Office action.

35 USC § 103(a) Rejection - Claims 1, 4 and 6

The Examiner first rejected claims 1, 4 and 6 under 35 USC 103(a) as being unpatentable over US Patent 6,169,972 (Kono et al.) in view of US Patent 5,754,736 (Aust). In particular, the Examiner cited Kono et al. as teaching "a method/system of performing natural language generation", with Aust cited as teaching the feature of using a "stochastic tree model to select syntactic realizations for each node in the derivation". The Examiner then concluded that "it would have been obvious to one of ordinary skill in the art at the time of invention to modify Kono et al. by incorporating the teaching of Aust in order to enhance [the] system's efficiency by recognizing meaningful words".

In response, applicants assert that Kono et al. cannot be found to disclose or suggest the three particular aspects of performing natural language generation as defined by claims 1, 4 and 6, namely: (1) using a "tree choosing module" to determine the proper trees for each node, based on a stochastic process; (2) using an "unraveler" to produce a lattice of all possible linearizations; and (3) using a "linear precedence chooser" to select the best path through the lattice to generate the "natural language" output. Kono et al., as discussed in the pertinent portions cited by the Examiner, functions to "perform an analysis" on a lattice structure to "properly connect the nodes" (see column 15 of Kono et al). At best, Kono et al. teaches a method of analyzing a given lattice structure to properly "interpret" the lattice and form a natural language output.

The Examiner cited Kono et al. at column 15, line 25 - column 16, line 5 as teaching the step of "applying an input dependency tree to a tree-choosing module to select syntactic realizations for each node in the derivation tree", where Examiner cites

Bangalore 2000-0034

the Kono et al. language of "word lattice is generated based on the input signal by connecting mode of words together forming candidate sequences of words". This portion of Kono et al., it is asserted, is clearly directed to generating a word lattice - not to "choosing" a particular tree module, which is precisely the subject matter of the present invention. Indeed, the Examiner is directed to the specification at page 4, beginning at line 12, where it reads as follows:

Tree chooser module 12 then utilizes a stochastic tree module to choose syntactic realizations for words. Therefore, if a TAG grammar is used as the reference grammar, then TAG trees are chosen for the nodes in the input structure. *This step in the process can be related to "supertagging" as performed in the prior art, except that in this case supertags (i.e., names of syntactic realizations, or in the case of a TAG reference grammar, names of trees) must be found for words in a tree rather than for words in a linear sequence [as in the prior art].* [emphasis added]

Thus, the present invention is directed to "selecting" syntactic/realizations for each node, then subsequent to this selection process, unraveling the tree structure to form the lattice structure. In contrast, Bono et al. begins with the defined lattice structure (developed by an unspecified method), then generates the natural language output from the lattice (see the section of Kono et al. quoted above, which states "word lattice is generated based on the input signal". There is no teaching of utilizing a "tree choosing module" in Kono et al., as stated in rejected independent claims 1 and 4.

The Examiner has cited Aust as teaching "a method using stochastic tree model to select syntactic realizations for each node in the derivation tree", citing column 4, lines 21-63 of Aust. The cited portion of Aust, it is asserted, is directed to the formation of a "concept graph" from a "word graph", each graph comprising a set of nodes (see, in particular, column 4 at lines 23-31 for a description of transforming a word graph into a concept graph). There is no description or discussion in Aust directed to "stochastic tree models", or a "derivation tree". Aust does describe the use of "an attributed context-free stochastic grammar", which is used as a speech model during the word-concept transformation, but there is no disclosure or use of "tree" structure.

Based on these differences, therefore, applicants assert that the combination of Bono et al. and Aust cannot be found to render obvious the subject matter of rejected

Bangalore 2000-0034

claims 1, 4 and 6. Applicants therefore respectfully request the Examiner to reconsider this rejection and find claims 1, 4 and 6, as amended, to be in condition for allowance.

35 USC § 103(a) Rejection - Claims 3 and 5

Claims 3 and 5 were next rejected by the Examiner under 35 USC 103(a) as being unpatentable over Kono et al. and Aust (as above), in further view of US Patent 5,241,619 (Schwartz et al.). In this rejection, the Examiner cited Schwartz et al. as teaching the use of "the Viterbi algorithm to search the trellis to find the best path". While it may be true that Schwartz et al. teaches the use of the Viterbi algorithm, applicants assert that the combination of Schwartz et al. with Bono et al. and Aust still lacks any teaching of using a "tree choosing module" to select the proper "syntactic realizations", as defined by rejected claims 1 and 4 (from which claims 3 and 5 depend, respectively). Thus, while teachings of Schwarz et al. may be combined with Bono et al. (or Aust) to suggest the use of the Viterbi algorithm when progressing through the lattice structure, the combination does not teach the use of "tree selection" and the use of tree structure as an input to a lattice module, as defined by claims 1 and 4. Applicants therefore respectfully request the Examiner to reconsider this rejection and find claims 3 and 5 to be in condition for allowance.

35 USC § 103(a) Rejection - Claims 2 and 7

Lastly, the Examiner rejected claims 2 and 7 under 35 USC 103(a) as being unpatentable over Kono et al. and Aust, in view of applicants' "admitted prior art" teaching that the grammar may be an "extended *tree-adjointed grammar* (XTAG) grammar". While XTAG is disclosed as being in the prior art, there is still no teaching of utilizing a tree-choosing module to develop a set of syntactic realizations for each node in a (semi-specific) derivation tree, as defined by independent claims 1 and 4, from which claims 2 and 7 depend. Applicants therefore respectfully request the Examiner to reconsider this rejection and find claims 2 and 7 to be in condition for allowance.

Bangalore 2000-0034

Summary

The present application contains claims 1-7, where the specification has been amended to correct typographical errors, and independent claims 1 and 4 have been amended to clearly define the subject matter of the present invention. These various amendments, however, are not considered necessary to differentiate the subject matter of the present invention from the prior art, since there is no teaching of a "tree choosing module" in any of the cited prior art. Applicants believe that the case, in its present form, is now in condition for allowance and respectfully request an early and favorable response from the Examiner in that regard. If for some reason or other the Examiner does not agree that the case is ready to issue and that an interview or telephone conversation would further the prosecution, the Examiner is invited to contact applicants' attorney at the telephone number listed below.

Respectfully submitted,

Srinivas Bangalore
Owen Christopher RambowBy: Wendy W. Koba
Wendy W. Koba
Reg. No. 30509
Attorney for applicant
610-346-7112Date: 9/15/04